

इंटरनेट

मानक

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Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 12320 (1988): Technical supply conditions for circular screwing dies [PGD 32: Cutting tools]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

TECHNICAL SUPPLY CONDITIONS FOR
CIRCULAR SCREWING DIES

1. Scope — Covers the technical supply conditions of circular screwing dies for general engineering purposes classified as:

- a) Cut thread screwing dies, and
- b) Ground thread screwing dies.

2. Material

2.1 The material for the manufacture of dies shall be:

- a) Carbon tool steel, and
- b) High speed steel.

Note 1 — Unless otherwise specified, the carbon tool steel shall be of designation 80T6, T80V2, T118Cr2, T135Cr2 or T90Mn6WCr2 according to IS 3749-1978 'Specification for tool and die steels for cold work (first revision)', or equivalent based on any other recognized standard in which case major constituents shall be specified by the manufacturer

Note 2 — Unless otherwise specified, the high speed steel shall be of designation XT87W6Mo5Cr4V2 or XT72W18Cr4V1 in accordance with IS 7291-1981 'Specification for high speed tool steels (first revision)', or equivalent based on any other recognized standard in which case major constituents shall be specified by the manufacturer

3. Hardness — Shall be measured on die face near to the cutting edge and shall be as follows:

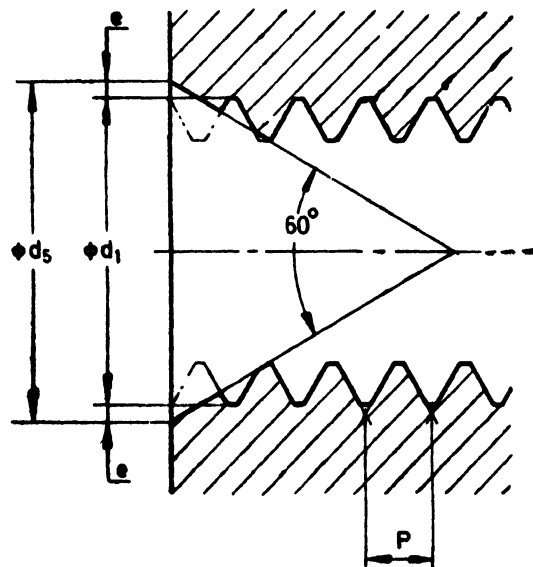
- | | | |
|----------------------------|----------------------------|--|
| a) Carbon tool steel dies: | 700 HV, Min
750 HV, Max | Measured on die face near
to the cutting edge |
| b) High speed steel dies: | 746 HV, Min
800 HV, Max | |

4. General Requirements

4.1 All dies shall have clearance holes, unless otherwise specified; the number of cutting edges for a die shall be three or more at the discretion of the manufacturer. The rake angle of die shall be ground.

4.2 Chamfer — Thread cutting dies are provided with chamfer on both sides only in case of parallel screw thread dies so as to cut the threads from both the sides.

4.2.1 The chamfer shall be provided with relief to provide radial clearance to the cutting edge



Adopted 9 March 1988

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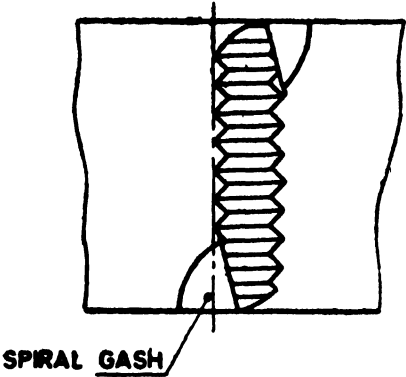
Gr 3

4.2.2 The chamfer diameter shall be calculated as: $d_5 = d_1 + 2e$

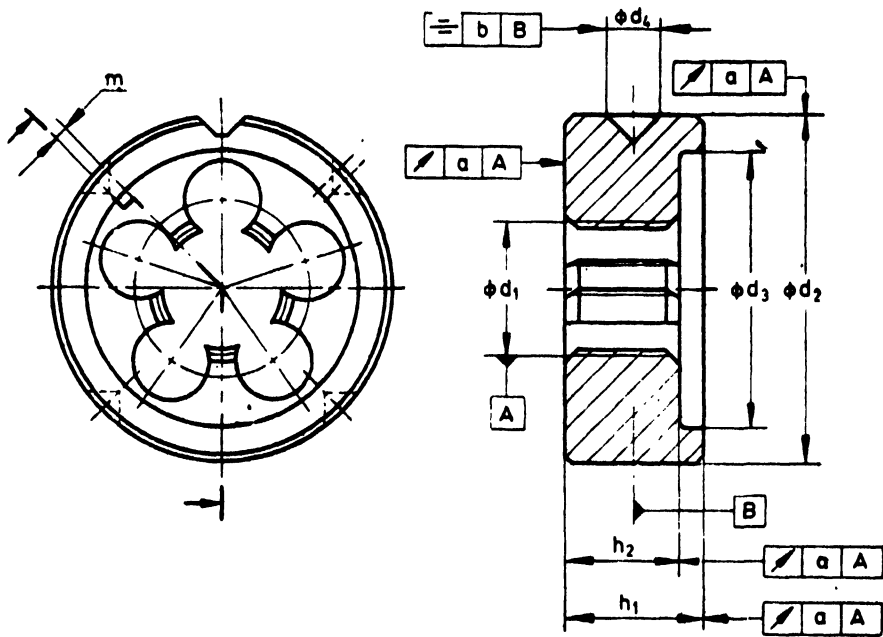
All dimensions in millimetres.

ISO Metric Thread Coarse Pitch		d_5	ISO Metric Fine Threads with Pitch		d_5
From	Up to				
M 1	M 1.8	$d_1 + 0.1$	0.2 0.25 0.35		$d_1 + 0.1$
M 2	M 2.6	$d_1 + 0.2$	0.5 0.75		$d_1 + 0.3$
M 3	M 4	$d_1 + 0.3$	1.0 1.25 1.5		$d_1 + 0.4$
M 5	M 11	$d_1 + 0.4$	2		$d_1 + 0.6$
M 12	M 16	$d_1 + 0.6$	3		$d_1 + 0.8$
M 18	M 27	$d_1 + 0.8$	4		$d_1 + 1.0$
M 30	M 39	$d_1 + 1$			
M 40	M 45	$d_1 + 1.2$			
M 48	M 52	$d_1 + 1.5$			
M 56	M 60	$d_1 + 2$			
M 64	M 68	$d_1 + 2.5$			

4.3 *Spiral Gash* — Spiral gash may be provided if required by the purchaser, at the cutting edge to facilitate chip flow.



4.4 Tolerance



AMENDMENT NO. 1 JULY 1990
TO
IS 12320 : 1988 TECHNICAL SUPPLY
CONDITIONS FOR CIRCULAR SCREWING DIES

(*Page 3, clauses 4.4.1 and 4.5*) — Substitute ' a ' for ' A ' for runout tolerance wherever appearing.

(PED 13)

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4.4.1 Axial and radial runout A shall be as given below:

All dimensions in millimetres.

<i>d</i> ₂		Ground Thread Tolerance	Cut Thread Tolerance
Over	Up to and Including	A	A
16	20	0.01	0.05
25	38	0.02	0.07
45	75	0.05	0.10
90	120	0.10	0.15

4.4.2 Symmetry tolerance $b = \frac{j_s 9}{2}$.

4.5 Conical holes on the circumference of die shall be offset from the centreline by the value 'A' as given in IS : 12319-1988 'General dimensions for circular screwing dies'.

4.6 Tolerance on dimensions without specified tolerances, shall be of grade medium according to IS : 2102 (Part 1)-1980 'General tolerances for dimensions and form and position: Part 1 General tolerances for linear and angular dimensions (*second revision*)'.

5. **Workmanship and Finish** — Dies shall be supplied well finished, free from burrs and ready for use.

6. **Marking** — The dies shall be marked with the following information:

Example

- | | |
|--|-------|
| a) Nominal size | — M10 |
| b) Class of die (other than 6 h) | — 4 h |
| c) Material of the die (other than carbon steel) | — HSS |
| d) Letter G (only for ground thread die) | — G |
| e) Letter LH (for left hand thread) | — LH |

7. **Protective Coating and Packaging**

7.1 Each die shall be covered in a suitable rust proof material.

7.2 Each die shall be wrapped in non-absorbent paper and packed in a carton.

7.3 The carton shall bear the following information:

- a) Type of die,
- b) Designation, and
- c) Manufacturer's name, initials or trade-mark.

8. **Tests**

8.1 The dies shall be inspected for compliance with this standard regarding workmanship. Dies shall be inspected for the dimensions it produces on the bolt as specified in the relevant Indian Standard.

8.2 Samples drawn in accordance with IS : 7778-1975 'Methods of sampling small tools' shall be subjected to the test. If any test sample fails, double the number of first sample shall be drawn and subjected to the same test. In case any of the second sample fails, the lot presented shall be liable for rejection.

8.3 **Performance Test**

8.3.1 *Adjustable circular screwing die (after adjusting screw)* — The threads produced by the die are checked with a suitable thread ring gauge. In case of doubt, a manual thread cutting operations can be carried out.

8.3.2 *Solid circular screwing die* — The test is carried out as:

A thread of minimum length of $3l$, where l = die width, shall be cut on a specimen bar of free cutting steel as specified in IS : 4431-1978 'Specification for carbon and carbon manganese free cutting steels', having a tensile strength of 400 to 500 MPa under the following conditions:

- a) The die shall be fixed end on;

- b) The non-coaxiality between the tool and the work axes shall be compensated by suitably mounting the die;
- c) The cutting shall be done at the rate of 4 to 6 metres per minute; and
- d) Proper coolant shall be used.

The conditions for the specimen to be threaded in the case of dies, which have to cut thread on material having tensile strength above 500 MPa, shall be as agreed upon between the purchaser and the manufacturer. For carrying out the test, the material to be threaded shall be supplied by the purchaser.

8.3.3 The test thread cut shall be clean and without breaks. After the thread cutting of the first test specimen, the threads of the test die shall not show any rupture or blunting and the same shall be observed under a microscope. The threaded specimen shall be tested by a 'GO' ring gauge of the corresponding thread tolerance and measuring thread.

8.3.4 The microscopic measurement of the cut thread is carried out in the middle zone of the thread length and comprises profile accuracy and the partial thread angle deviation (flank angle deviation). The tolerance on the partial thread angle shall be as given below:

All dimensions in millimetres.

Nominal Thread Size		Deviation in Minutes
Over	Up to and Including	
1.0	1.2	100
1.2	1.4	90
1.4	1.6	80
1.6	2.2	70
2.2	3.5	60
3.5	5.0	50
5.0	12.0	40
12.0	63.0	30

8.3.5 The pitch is measured over the number of threads and over this region, the tolerance shall be $\pm 50 \mu\text{m}$. The number of threads shall be as given below:

All dimensions in millimetres.

Cumulative Pitch		Measuring Range (No. of Threads)
From	To	
0.2	0.6	14
0.6	0.8	12
1.0	2.0	10
2.5	3.0	6
3.5	6.0	4

EXPLANATORY NOTE

The requirements of thread cutting dies were earlier covered under IS : 1859-1961. IS : 1859 is being modified and replaced by a series of standards to include various requirements pertaining to screwing dies which have been felt necessary at the national and international level. The title of the standard is also being modified as 'Circular screwing dies' in place of 'Thread cutting dies' so as to bring it in line with the terminology agreed to at the international level.

The series of standards are as follows:

IS : 12319-1988	General dimensions for circular screwing dies
IS : 12320-1988	Technical supply conditions for circular screwing dies
IS : 12321-1988	Circular screwing dies for ISO metric screw threads
IS : 12322-1988	Circular screwing dies for taper pipe threads—R series
IS : 12323-1988	Circular screwing dies for parallel pipe threads—G series
IS : 12324-1988	Hexagonal die nuts
IS : 12325-1988	Circular screwing dies for ISO metric conduit pipe threads

On the publication of above standards, IS : 1859 will stand withdrawn.

In the preparation of this standard, considerable assistance has been derived from:

- a) ISO 2568-1973 Hand- and machine-operated circular screwing dies and hand-operated die stocks. International Organization for Standardization (ISO).
- b) ISO 4230-1987 Hand- and machine-operated circular screwing dies for taper pipe threads—R series. International Organization for Standardization (ISO).
- c) ISO 4231-1987 Hand- and machine-operated circular screwing dies for parallel pipe threads—G series. International Organization for Standardization (ISO).
- d) ISO 5968-1981 Circular screwing dies—Terminology. International Organization for Standardization (ISO).
- e) ISO 7226-1985 Dimensions of hexagon die nuts. International Organization for Standardization (ISO).
- f) DIN 223 (Part I)-1979 Punde Schaceideisen für Metrisches ISO Feingewinde von M1 bis M68 (Circular screwing dies for fine pitch metric ISO threads for M1 to M68). Deutsches Institut für Normung (DIN)
- g) DIN 223 (Part III)-1979 Punde Schnsideisen General Plan der Ambessungen (Circular screwing dies for fine pitch, ISO metric threads for M1 to M68). Deutsches Institut für Normung (DIN).
- h) DIN 223 (Part X)-1979 Punde Schnsideisen General Plan der Ambessungen (Circular screwing dies general table of dimensions). Deutsches Institut für Normung (DIN).
- j) DIN 382-1987 Sechskant-Schncideisen (Hexagonal die nuts). Deutsches Institut für Normung (DIN).